PATENT
Attorney Docket No. 99078X206650
LVM Reference No. 206650

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Darsillo et al.

Application No. 09/670,118

Filed: September 26, 2000

For: RECORDING MEDIUM

Art Unit: 1773

Examiner: Kevin M. Bernatz

APPELLANTS' APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In support of the appeal from the final rejection dated November 10, 2003, Appellants now submit their Appeal Brief.

Real Party In Interest

The patent application that is the subject of this appeal is assigned to Cabot Corporation.

Related Appeals and Interferences

There are no appeals or interferences that are related to this appeal.

Status of Claims

Claims 1-3, 5, 7, 29, 30, 33, 44-48, and 58-67 currently are pending and are set forth in the Appendix attached hereto. All of the pending claims have been rejected and are the subject of this appeal.

Status of Amendments

No amendments to the claims have been filed subsequent to the final rejection. The Rule 132 Declaration of Michael D. Morris filed with Applicants' "Response to Office Action" dated March 10, 2004, has been entered.

Summary of Invention

The present invention relates to an ink-jet recording medium comprising a substrate having a glossy coating thereon, the glossy coating comprising fumed alumina particles and a binder (see, for example, the specification at page 5, lines 12-15, and page 6, lines 22-25). In particular, the glossy coating comprises fumed alumina particles having a surface area of about 30-80 m^2/g (see, for example, the specification at page 9, line 22 – page 10, line 2), and the glossy coating has a 75° specular gloss of about 15% or more (see, for example, the specification at page 10, lines 24-29). With this combination of features, the present invention provides an ink-jet recording medium exhibiting good dye immobilization properties, excellent waterfastness, a relatively high rate of liquid absorption, and a relatively high capacity for liquid absorption (see, for example, the present specification at page 11, lines 1-24, and page 12, line 1 – page 14, line 29).

Issues

The issues on appeal are as follows:

(a) whether the subject matter of claims 1-3, 7, 33, and 44-48 is anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 5,171,626 (Nagamine et al.) (hereinafter "the Nagamine '626 patent"),

(b) whether the subject matter of claims 1-3, 7, 33, and 44-48 is obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 5,561,454 (Kurabayashi et al.) (hereinafter "the Kurabayashi '454 patent") in view of the combination of U.S. Patent No. 5,910,359 (Kobayashi et al.) (hereinafter "the Kobayashi '359 patent"), U.S. Patent No. 5,856,001 (Okumura et al.) (hereinafter "the Okumura '001 patent"), and one or more of: U.S. Patent No. 5,198,306 (Kruse) (hereinafter "the Kruse '306 patent"), U.S. Patent No. 5,911,855 (Dransmann et al.) (hereinafter "the Dransmann '855 patent"), U.S. Patent No. 6,238,784 (Mochizuki et al.) (hereinafter "the Mochizuki '784 patent"), and the *Handbook of Fillers*, page 131 (2nd Ed.)

(c) whether the subject matter of claims 5, 29, 30, and 60-63 is obvious under 35 U.S.C. § 103(a) over (i) the Nagamine '626 patent in view of U.S. Patent No. 6,187,430 (Mukoyoshi et al.) (hereinafter "the Mukoyoshi '430 patent") or (ii) the Kurabayashi '454 patent in view of the combination of the Kobayashi '359 patent, the Okumura '001 patent, the Mukoyoshi '430 patent, and one or more of: the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*, and

(d) whether the subject matter of claims 58, 59, and 64-67 is obvious under 35 U.S.C. § 103(a) over (i) the Nagamine '626 patent in view of the Mukoyoshi '430 patent and U.S. Patent No. 5,965,244 (Tang et al.) (hereinafter "the Tang '244 patent") or (ii) the Kurabayashi '454 patent in view of the combination of the Kobayashi '359 patent, the Okumura '001 patent, the Mukoyoshi '430 patent, and the Tang '244 patent, and one or more of: the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*.

Grouping of Claims

The appealed claims do not stand and fall together. For the reasons discussed below, and as confirmed by the Examiner's separate rejection of the claims, claims 1-3, 7, 33, and 44-48 should be considered separately from claims 5, 29, 30, and 60-63, as well as claims 58, 59, and 64-67, for purposes of this appeal.

Argument

A. Rejection of Claims 1-3, 7, 33, and 44-48 under Section 102(b) over the Nagamine '626 Patent

The Examiner alleges that the subject matter of claims 1-3, 7, 33, and 44-48 is anticipated under 35 U.S.C. § 102(b) by the Nagamine '626 patent. In particular, the Examiner asserts that (i) the Nagamine '626 patent discloses an ink-jet recording medium comprising a substrate having a glossy coating thereon, (ii) the Nagamine '626 patent provides that the glossy coating can comprise a binder and fumed alumina particles having a surface area of about 30-80 m^2/g, and (iii) in view of the similarities between the ink-jet recording medium recited in the rejected claims and the ink-jet recording medium disclosed in the Nagamine '626 patent, the ink-jet recording medium disclosed in the Nagamine '626 patent would inherently exhibit a 75° specular gloss of about 15% or more, as recited in the rejected claims.

Anticipation under 35 U.S.C. § 102 requires the disclosure in a single prior art reference of each and every element of a claimed invention, arranged as in the claim. *Brown v. 3M*, 265 F.3d 1349, 1351, 60 U.S.P.Q.2d 1375, 1376 (Fed. Cir. 2001); *Apple Computer, Inc. v. Articulate Sys., Inc.*, 234 F.3d 14, 20, 57 U.S.P.Q.2d 1057, 1061 (Fed. Cir. 2000). Thus, in order for an anticipation rejection over a prior art reference to be proper, the reference "must clearly and unequivocally disclose the claimed [subject matter] or direct those skilled in the art to the [subject matter] without *any* need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited

reference." *In re Arkley*, 455 F.2d 586, 587, 172 U.S.P.Q. 524, 526 (C.C.P.A. 1972) (emphasis in original).

The anticipation rejection over the Nagamine '626 patent set forth in the final Office Action requires just such picking, choosing, and combining. In particular, the Examiner arrives at the proposed combination only after using the present invention as a template to choose unrelated portions of Nagamine '626 patent and combine those unrelated portions in a manner neither taught by the Nagamine '626 patent itself nor envisaged by those of ordinary skill in the art. The anticipation rejection and its deficiencies are discussed in greater detail below.

The Nagamine '626 patent discloses an ink-jet recording medium comprising a substrate and a pigment layer provided on the substrate. The pigment layer comprises (i) an upper layer containing an aluminum oxide and (ii) a lower layer containing an aluminum oxide having a smaller surface area than the aluminum oxide in the upper layer (see, e.g., the Nagamine '626 patent at col. 2, lines 41-48). The Nagamine '626 patent further provides that the aluminum oxide contained within the lower layer preferably has a specific surface area of 10-90 m^2/g, and the aluminum oxide contained within the upper layer preferably has a specific surface area of 90-170 m^2/g (see, e.g., the Nagamine '626 patent at col. 4, lines 1-8 and 45-53).

This aforementioned disclosure of the Nagamine '626 patent differs from the ink-jet recording medium of the rejected claims by not specifying that the aluminum oxide (also known as alumina) in the uppermost layer of the ink-jet recording medium is *fumed* alumina having a surface area of *about 30-80 m^2/g*.

Despite the disclosure of the Nagamine '626 patent that the alumina of the uppermost layer of the ink-jet recording medium preferably is of a larger particle size than recited in the rejected claims, Example 3 of the Nagamine '626 patent discloses an ink-jet recording medium in which the uppermost layer comprises alumina particles having a surface area of about 60 m^2/g, albeit "the particles recited in Example 3 are not fumed alumina particles" (Advisory Action; see also Rule 132 Declaration of Michael D. Morris).

Nevertheless, the Examiner maintains that the anticipation rejection is proper because (a) Nagamine et al. [i.e., the Nagamine '626 patent] encompass embodiments where the surface area [of alumina particles] is less than 90 m^2/g in the upper layer" and (b) "the combined teaching of Nagamine et al. clearly provides for the use of fumed alumina" (i.e., the alumina particles *could have been* fumed alumina) (Advisory Action).

In asserting that the Nagamine '626 patent teaches such a combination, the Examiner picks, chooses, and combines isolated portions of the Nagamine '626 patent's specification in an effort to reconstruct the claimed invention, thereby improperly using the present invention

as a template for such hindsight reconstruction and ignoring the explicit teachings of the Nagamine '626 patent. In particular, the Examiner selects the Nagamine '626 patent's isolated disclosure of a recording medium whose uppermost layer comprises calcined or sintered alumina particles having a surface area of about 60 m^2/g (i.e., the recording medium of Example 3) and modifies that disclosure with the reference's teaching that the alumina particles in the recording medium can be fumed alumina particles, thereby arriving at a combination that is neither taught by the Nagamine '626 patent nor clearly envisaged by one of ordinary skill in the art from the Nagamine '626 patent's teachings. Indeed, nowhere in its disclosure does the Nagamine '626 patent connect or relate the passages relied upon by the Examiner in such a manner that the proposed combination can fairly be considered to be taught by the reference. Thus, as in *In re Arkley*, the Nagamine '626 patent does not clearly and unequivocally disclose the claimed subject matter or direct those skilled in the art to the subject matter without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference. *See In re Arkley*, 455 F.2d at 587-89, 172 U.S.P.Q. at 526-27. Therefore, contrary to the Examiner's assertions, the Nagamine '626 patent does not actually disclose, in the manner required for purposes of supporting an anticipation rejection, the claimed recording medium in which the glossy coating (i.e., uppermost layer) comprises a binder and fumed alumina particles having a surface area of about 30-80 m^2/g.

Indeed, the Examiner's rationale that everything recited in the Nagamine '626 patent is merely "preferred" and allows for alternatives essentially means that the Nagamine '626 patent discloses that *any* type of alumina particles with *any* surface area can be used in *any* layer of an ink-jet recording medium. Such a general disclosure does not properly form the basis of an anticipation rejection, where the claims in issue recite a *particular* type of alumina particles with a *particular* surface area in a *particular* layer of an ink-jet recording medium. As a practical matter, the Examiner appears to contend that a genus anticipates a species (or subgenus), when the case law is otherwise. *See*, *Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1572, 24 U.S.P.Q.2d 1331, 1332 (Fed. Cir. 1992); *Corning Glass Works v. Sumitomo Elec. U.S.A.*, 868 F.2d 1251, 1262-63, 9 U.S.P.Q.2d 1962, 1970-71 (Fed. Cir. 1989); *see also In re Baird*, 16 F.3d 380, 381-82, 29 U.S.P.Q.2d 1550, 1552 (Fed. Cir. 1994).

Moreover, it would not have been obvious for one of ordinary skill in the art to modify the disclosure of the Nagamine '626 patent in such a way as to arrive at the invention defined by the rejected claims, such as substituting fumed alumina particles having a surface area of about 30-80 m^2/g for the γ-alumina particles used in Example 3. The Nagamine '626 patent specifically provides that the surface area of the aluminum oxide particles in the upper

layer preferably is not less than 90 m^2/g (see, e.g., the Nagamine '626 patent at col. 4, lines 6-8). Indeed, when fumed alumina particles are used in the uppermost layer of the recording media disclosed in Nagamine '626 patent, those fumed alumina particles have a surface area of 100 m^2/g (see, e.g., the Nagamine '626 patent at col. 9, Example 4). Thus, to the extent that the Nagamine '626 patent discloses or suggests a recording medium in which the uppermost layer comprises *fumed* alumina particles, the Nagamine '626 patent teaches away from the use of fumed alumina particles with a surface area as recited in the rejected claims. Instead, the Nagamine '626 patent teaches the use of alumina particles having a surface area well in excess of the surface area recited in the rejected claims. Accordingly, the Examiner cannot properly assert that one of ordinary skill in the art, having read the Nagamine '626 patent, would have been motivated to modify the disclosure of the Nagamine '626 patent in such a way as to arrive at the invention defined by the rejected claims. Therefore, the invention defined by the rejected claims cannot properly be considered *prima facie* obvious over the Nagamine '626 patent alone.

For the foregoing reasons, the subject matter defined by the rejected claims is not anticipated (nor even rendered obvious) by the Nagamine '626 patent. In particular, the Nagamine '626 patent fails to disclose a recording medium in which the glossy coating (i.e., uppermost layer) comprises a binder and fumed alumina particles having a surface area of about 30-80 m^2/g. Accordingly, the Section 102(b) rejection of claims 1-3, 7, 33, and 44-48 is improper and should be reversed.

B. Rejection of Claims 1-3, 7, 33, and 44-48 under Section 103(a) over the Kurabayashi '454 Patent

The Examiner alleges that the subject matter of claims 1-3, 7, 33, and 44-48 (i.e., the same claims discussed in the preceding section) is unpatentable over the Kurabayashi '454 patent in view of the combination of the Kobayashi '359 patent, the Okumura '001 patent, and one or more of: the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*. In particular, the Examiner asserts that the Kurabayashi '454 patent discloses a recording medium comprising a substrate having a glossy coating thereon, wherein the glossy coating comprises a binder and alumina particles.

The Examiner acknowledges that the Kurabayashi '454 patent fails to teach or suggest a recording medium comprising a glossy coating having the specular gloss recited in the rejected claims, but asserts that it would have been obvious for one of ordinary skill in the art to modify the recording medium disclosed therein in such a way as to arrive at the invention defined by the rejected claims in view of the Kobayashi '359 patent. The Examiner further asserts that, in view of the teachings of the Okumura '001 patent, it would have been obvious

for one of ordinary skill in the art to modify the recording medium disclosed in the Kurabayashi '454 patent by selecting alumina particles having the surface area recited in the rejected claims. Lastly, the Examiner acknowledges that none of the aforementioned references teaches or suggests a recording medium comprising *fumed* alumina particles, but asserts that such modification of the recording medium disclosed in the Kurabayashi '454 patent would have been obvious to one of ordinary skill in the art in view of the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*, alone or in combination.

In order to set forth a *prima facie* case of obviousness based on a combination of references under Section 103(a), the Office Action must identify a "clear and particular" teaching, suggestion, or motivation to combine the references. *In re Demiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999), *abrogated on other grounds* by *In re Gartside*, 203 F.3d 1305, 1316, 53 U.S.P.Q. 2d 1769, 1769-1770 (Fed. Cir. 2000); *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998); *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051 (Fed. Cir. 1988). As the Federal Circuit has stated, "combining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight." *In re Demiczak*, 175 F.2d at 999.

The Kurabayashi '454 patent generally discloses an ink-jet recording medium comprising a base and a surface layer provided on the base. The surface layer comprises a binder and a pigment, and the Kurabayashi '454 patent further provides that suitable pigments include alumina (see, e.g., the Kurabayashi '454 patent at col. 3, lines 39-42). However, as acknowledged by the Examiner, the Kurabayashi '454 patent does not disclose or suggest a recording medium comprising *fumed* alumina particles having a surface area of 30-80 m^2/g, nor does it disclose or suggest a recording medium having a 75° specular gloss of about 15% or more, as recited in the rejected claims.

The Kobayashi '359 patent generally discloses an ink-jet recording medium comprising a transparent support and a transparent colorant-receptive layer, which layer is composed of crosslinked polymer particles. While the Kobayashi '359 patent does provide that small amounts of inorganic particles can be added to the colorant-receptive layer as a matting agent, it does not list fumed alumina as a suitable additive. Thus, the Kobayashi '359 patent cannot properly be considered to teach or suggest a recording medium comprising alumina particles, much less fumed alumina particles having a surface area of 30-80 m^2/g, as recited in the rejected claims.

The Okumura '001 patent discloses an ink-jet recording medium comprising an ink-receiving layer formed on a substrate, wherein the ink-receiving layer contains xerogel

pigment particles. The Okumura '001 patent further provides that the xerogel particles can be formed from hydrogel-forming materials, such as aluminum hydroxide, alumina, silica, and magnesium hydroxide. While the Okumura '001 patent discloses a broad surface area range for the xerogel particles, which overlaps with the range recited in the rejected claims, such a broad teaching for xerogel particles would not have motivated one of ordinary skill in the art to modify the recording medium disclosed in the Kurabayashi '454 patent by using *fumed* alumina particles having a surface area of about 30-80 m^2/g. Indeed, xerogel particles are loosely agglomerated particles formed from metal oxide gels that have been dried and wherein the gel structure has been allowed to collapse. By way of contrast, as set forth in the Rule 132 Declaration of Michael D. Morris, *fumed* alumina particles are aggregates of smaller primary particles connected in a three-dimensional chain-like structure. Thus, the particles are structurally quite different, and the Okumura '001 patent's teaching regarding suitable surface areas for xerogels cannot, without further motivation, be applied to fumed alumina particles.

The Examiner's obviousness argument appears to be premised upon the assertion that the alleged suitability of xerogel particles, such as alumina xerogel particles, having the particular surface area range described in the Okumura '001 patent would have made it obvious to try the same surface area range, or a portion thereof, when using fumed alumina particles in a recording medium. However, it is well settled that "obvious to try" is not the standard mandated by 35 U.S.C. § 103. *See, e.g., In re Roemer*, 258 F.3d 1303, 1309-10, 59 U.S.P.Q.2d 1527, 1531 (Fed. Cir. 2001); *Ecolochem, Inc. v. Southern California Edison Co.*, 227 F.3d 1361, 1374, 56 U.S.P.Q.2d 1065, 1075 (Fed. Cir. 2000); *Gillette Co. v. S.C. Johnson & Son, Inc.*, 919 F.2d 720, 725, 16 U.S.P.Q.2d 1923, 1928 (Fed. Cir. 1990).

Moreover, the Okumura '001 patent discloses xerogel particles having a wide range of surface areas (e.g. 25 to 400 m^2/g, preferably about 100 to 400 m^2/g). Yet, there is nothing within the Okumura '001 patent that would have motivated one of ordinary skill in the art to select a particle having a surface area of about 30-80 m^2/g, as recited in the rejected claims. Indeed, one of ordinary skill in the art would have been motivated to use a higher surface area particle in view of the fact that all of the Okumura '001 patent's examples utilize relatively high surface area particles and that the range of about 100 to 400 m^2/g is indicated as preferred in the Okumura '001 patent. Thus, the Examiner cannot properly assert that one of ordinary skill in the art, having read the Okumura '001 patent, would have been motivated to combine and modify the cited references in such a way as to arrive at a recording medium comprising fumed alumina particles having a surface area of about 30-80 m^2/g.

As noted above, the Examiner acknowledges that the aforementioned references, alone or in combination, fail to teach or suggest a recording medium comprising *fumed*

alumina particles. However, the Examiner asserts that such a recording medium would have been obvious to one of ordinary skill in the art upon further considering the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*, alone or in combination. The Kruse '306 patent merely discloses the use of alumina in the surface layer of a transparency to improve its "pencil tooth," and does not contain any teaching or suggestion regarding the alleged equivalence of fumed alumina and other types of alumina in coatings applied to ink-jet recording media. The Mochizuki '784 patent generally discloses a recording medium comprising a support and an ink-receiving layer, which comprises a binder and solid fine particles, provided thereon. The Mochizuki '784 patent further provides a long list of suitable solid fine particles, which includes alumina, colloidal alumina, hydrated alumina, and aluminum hydroxide (see, e.g., the Mochizuki '784 patent at col. 3, lines 5-19). The Dransmann '855 patent discloses an ink-jet recording medium comprising a support, a dye-receiving coating, and an upper coating comprising particles of a porous inorganic pigment exhibiting cationic charge centers (see the Dransmann '855 patent at col. 2, lines 42-46). The Dransmann '855 patent further provides that suitable particles include aluminum oxides, pyrogenic aluminum hydroxides, and aluminum oxide hydrates (see, e.g., the Dransmann '855 patent at col. 2, lines 47-50). However, contrary to the Examiner's assertions, the Mochizuki '784 and the Dransmann '855 patents do not teach or suggest that fumed alumina is equivalent to other types of alumina in coatings applied to ink-jet recording media. Indeed, the terms "hydrated alumina" and "pyrogenic aluminum hydroxides" refer to a true hydroxide of aluminum (i.e., $Al(OH)_3$) that is chemically distinct from alumina, which has the chemical formula Al_2O_3 (see, e.g., *The Merck Index*, pp. 61 and 62 (12th Ed.) (previously submitted)). Lastly, the excerpted portion of the *Handbook of Fillers* merely provides that the terms "pyrogenic silica" and "fumed silica" refer to the same type of silica. However, the alleged equivalence of the terms "pyrogenic" and "fumed" is irrelevant insofar as the cited references only teach "pyrogenic *aluminum hydroxides*" (see, e.g., the Dransmann '855 patent at col. 2, lines 476-50), which compounds are chemically distinct from *alumina*, much less *fumed alumina*. Thus, none of these cited references even mentions *fumed* alumina, much less teaches or suggests that it is equivalent to other types of alumina in coatings applied to ink-jet recording media.

In an effort to further support the obviousness rejection, the Examiner asserts that fumed alumina is merely alumina made by a specific process and that it is, therefore, equivalent to other forms of alumina. While the term "fumed alumina" refers to alumina made in a particular manner, the Examiner is not correct that fumed alumina is necessarily equivalent to other forms of alumina. In particular, as evidenced by the Rule 132 Declaration of Michael D. Morris, fumed alumina particles consist of a plurality of discrete, substantially

spherical primary particles that are fused together to form a three-dimensional, chain-like aggregate. The Rule 132 Declaration further demonstrates that the structure of fumed alumina is significantly different from the structure of colloidal alumina particles formed by other processes, which typically consist of a plurality of discrete, substantially spherical primary particles that exist as discrete primary particles or are loosely agglomerated to form a network of primary particles. Furthermore, as is readily understood by those of ordinary skill in the art, the physical and structural differences between fumed alumina and other forms of alumina can significantly impact the behavior of each type of alumina in a particular application, such as ink-jet recording media. Therefore, *fumed* alumina particles cannot properly be deemed equivalent to other forms of alumina in the context of ink-jet recording media such that it would have been obvious to one of ordinary skill in the art to modify the recording medium disclosed in the cited references in such a way as to arrive at the invention defined by the rejected claims.

In view of the foregoing, the invention defined by the rejected claims is not obvious over the Kurabayashi '454 patent in view of the combination of the Kobayashi '359 patent, the Okumura '001 patent, and one or more of: the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent and the *Handbook of Fillers*. In particular, none of the cited references teaches or suggests a recording medium comprising a substrate having a glossy coating thereon, wherein the glossy coating comprises a binder and fumed alumina particles having a surface area of about 30-80 m^2/g. Accordingly, the Section 103 rejection of claims 1-3, 7, 33, and 44-48 is improper and should be reversed.

C. Rejection of Claims 5, 29, 30, and 60-63 under Section 103(a)

The Examiner alleges that the subject matter of claims 5, 29, 30, and 60-63 is unpatentable over (i) the Nagamine '626 patent in view of the Mukoyoshi '430 patent and (ii) the Kurabayashi '454 patent in view of the combination of the Kobayashi '359 patent, the Okumura '001 patent, the Mukoyoshi '430 patent, and one or more of: the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*. These claims differ from the claims discussed in the preceding two sections by further specifying average aggregate and/or primary particle sizes for the fumed alumina particles e.g., either an average aggregate size of about 1 μm or less or a mean primary particle diameter of about 1-100 nm. While the Examiner acknowledges that the aforementioned references or combinations of references fail to teach or suggest utilizing *fumed alumina* particles comprising aggregates of primary particles with particular average aggregate and/or primary particle sizes, the Examiner asserts that the Mukoyoshi '430 patent's teaching regarding the average primary and secondary particle size of *silica* used in an ink-receiving

layer would have motivated one of ordinary skill in the art to modify the disclosures of the other cited references in such a way as to arrive at the invention defined by claims 5, 29, 30, and 60-63.

Insofar as claims 5, 29, 30, and 60-63 further define the subject matter of claims 1-3, 7, 33, and 44-48, these claims are patentable over the cited references for the reasons set forth in the discussion of the rejection of claims 1-3, 7, 33, and 44-48 over the cited references in the preceding two sections. Furthermore, even if one or both of the rejections of claims 1-3, 7, 33, and 44-48 are affirmed, the rejection of claims 5, 29, 30, and 60-63 over those cited references in combination with the Mukoyoshi '430 patent should be reversed for at least the following reasons.

The Mukoyoshi '430 patent does not remedy the deficiencies of the cited references discussed in the preceding two sections with respect to the subject matter of claims 5, 29, 30, and 60-63. The Mukoyoshi '430 patent generally discloses an ink-jet recording medium comprising a cast-coated ink-receiving layer containing a binder and fine *silica* particles with an average primary particle size of 3 to 40 nm and an average secondary particle size of 10 to 400 nm. While the Mukoyoshi '430 patent discloses that the undercoat layer of the recording medium can comprise alumina, the Mukoyoshi '430 patent does not teach or suggest that the ink-receiving layer of the recording medium can comprise *alumina* particles, much less *fumed alumina* particles having a surface area of about 30-80 m^2/g and having either an average aggregate size of about 1 μm or less or a mean primary particle diameter of about 1-100 nm. Therefore, the proposed combinations of the cited references already discussed and the Mukoyoshi '430 patent do not teach or suggest a recording medium in which the glossy coating (i.e., uppermost layer) comprises a binder and fumed alumina particles having a surface area of about 30-80 m^2/g and having either an average aggregate size of about 1 μm or less or a mean primary particle diameter of about 1-100 nm.

Furthermore, contrary to the Office Action's assertions, one of ordinary skill in the art would not have been motivated to combine the disclosures of the cited references discussed in the preceding two sections and the Mukoyoshi '430 patent in such a way as to arrive at the particle size ranges for the fumed alumina particles as recited in the rejected claims. The Mukoyoshi '430 patent's disclosure relating to suitable particle sizes is limited to the particle size of the fine *silica* particles contained in the ink-receiving layer of the recording medium. There is nothing within the cited references or the knowledge generally available to those of ordinary skill in the art that would have suggested that, at the time of invention, the particle size ranges disclosed in the Mukoyoshi '430 patent for *silica* particles would have been suitable particle size ranges for *alumina* particles, let alone *fumed alumina particles*, in the context of ink-jet recording media. Indeed, as evidenced by the Rule 132 Declaration of

Michael D. Morris, there is nothing within the art that would suggest that a physical characteristic that is suitable for silica particles, such as the silica particles of the Mukoyoshi '430 patent, also would be suitable for alumina particles, let alone fumed alumina particles, in the context of ink-jet recording media in view of the differences in composition and chemistry between the two types of particles. At best, the Examiner's obviousness argument is premised upon the assertion that the Mukoyoshi '430 patent's disclosure regarding suitable particles sizes for silica particles in a recording medium would have made it obvious to try those particle size ranges in a recording medium comprising fumed alumina. However, as noted above, "obvious to try" is not the standard mandated by 35 U.S.C. § 103.

Insofar as the Mukoyoshi '430 patent fails to disclose or suggest a recording medium comprising fumed alumina, much less fumed alumina particles having a surface area of about 30-80 m^2/g and having either an average aggregate size of about 1 μm or less or a mean primary particle diameter of about 1-100 nm, the combinations of references proposed by the Examiner cannot properly be considered to disclose or suggest a recording medium in which the glossy coating (i.e., uppermost layer) comprises a binder and fumed alumina particles as recited in claims 5, 29, 30, and 60-63. Thus, the Section 103 rejection of claims 5, 29, 30, and 60-63 over the cited references is improper and should be reversed.

D. Rejection of Claims 58, 59, and 64-67 under Section 103(a)

The Examiner alleges that the subject matter of claims 58, 59, and 64-67 is unpatentable over (i) the Nagamine '626 patent in view of the Mukoyoshi '430 patent and the Tang '244 patent and (ii) the Kurabayashi '454 patent in view of the combination of the Kobayashi '359 patent, the Okumura '001 patent, the Mukoyoshi '430 patent, the Tang '244 patent, and one or more of: the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*. These claims differ from the claims discussed in the preceding sections by further specifying that certain percentages of the fumed alumina particles have particular aggregate or primary particles sizes, e.g., either at least about 80% of the aggregates have a mean diameter of about 1 μm or less or at least about 80% of the primary particles have a mean diameter of about 1-100 nm. While the Examiner acknowledges that the aforementioned references or combinations of references fail to teach or suggest utilizing *fumed alumina* particles comprising aggregates of primary particles with certain percentages of the particles having particular average aggregate or primary particle sizes, the Examiner asserts that the Tang '244 patent's disclosure regarding the particle size distribution of the particles in the printing medium would have motivated one of ordinary skill in the art to modify the combined disclosures of the other cited references in such a way as to arrive at the invention defined by the rejected claims.

Insofar as claims 58, 59, and 64-67 further define the subject matter of claims 1-3, 5, 7, 29, 30, 33, 44-48, and 60-63, these claims are patentable over the cited references for the reasons set forth in the discussion of the rejection of the other claims over the cited references discussed in the preceding sections. Furthermore, even if one of the rejections of the other claims is affirmed, the rejection of claims 58, 59, and 64-67 over those cited references in combination with the Tang '244 patent should be reversed for at least the following reasons.

The Tang '244 patent does not remedy the deficiencies of the cited references discussed in the preceding three sections with respect to the subject matter of claims 58, 59, and 64-67. The Tang '244 patent relates to a printing medium for ink-jet printing comprising a coating layer that comprises porous particles, colloidal particles, and a resin binder. The colloidal particles are greater in size than the size of the pores of the porous particles, but smaller than the interstitial pores created by the porous particles. Despite its disclosure relating to the use of alumina as the porous particles, the Tang '244 patent does not disclose or suggest a recording medium comprising *fumed* alumina particles, much less fumed alumina particles having a surface area of about 30-80 m^2/g, having either an average aggregate size of about 1 μm or less or a mean primary particle diameter of 1-100 nm, and with either at least about 80% of the aggregates having a mean diameter of about 1 μm or less or at least about 80% of the primary particles having a mean diameter of about 1-100 nm. Indeed, as can be seen from the Figure of the Tang '244 patent, the porous particles used in the disclosed recording medium desirably are substantially spherical in shape, as opposed to having the chain-like aggregate structure of fumed alumina particles. Therefore, to the extent that the Tang '244 patent teaches a recording medium comprising alumina particles, the Tang '244 patent teaches away from the use of *fumed* alumina particles. Accordingly, the Examiner cannot properly assert that one of ordinary skill art, having read the Tang '244 patent, would have been motivated to modify the disclosures of the cited references discussed in the preceding three sections by utilizing fumed alumina particles having a surface area of about 30-80 m^2/g, having either an average aggregate size of about 1 μm or less or a mean primary particle diameter of 1-100 nm, and with either at least about 80% of the aggregates having a mean diameter of about 1 μm or less or at least about 80% of the primary particles having a mean diameter of about 1-100 nm.

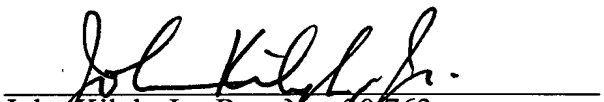
Insofar as the Tang '244 patent fails to disclose or suggest a recording medium comprising fumed alumina, much less fumed alumina particles having a surface area of about 30-80 m^2/g, having either an average aggregate size of about 1 μm or less or a mean primary particle diameter of 1-100 nm, and with either at least about 80% of the aggregates having a mean diameter of about 1 μm or less or at least about 80% of the primary particles having a mean diameter of about 1-100 nm, the combinations of references proposed by the Examiner

cannot properly be considered to disclose or suggest a recording medium in which the glossy coating (i.e., uppermost layer) comprises a binder and fumed alumina particles as recited in claims 58, 59, and 64-67. Thus, the Section 103 rejection of claims 58, 59, and 64-67 over the cited references is improper and should be reversed.

Conclusion

In view of the above, Appellants respectfully urge that the Examiner's rejections be reversed.

Respectfully submitted,



John Kilyk, Jr., Reg. No. 30,763
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson Avenue
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

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APPENDIX – CLAIM STATUS

1. (Previously Presented) An ink-jet recording medium comprising a substrate having a glossy coating thereon, the glossy coating comprising fumed alumina particles and a binder, wherein the fumed alumina particles have a surface area of about 30-80 m^2/g, and the glossy coating has a 75° specular gloss of about 15% or more.

2. (Previously Presented) The ink-jet recording medium of claim 1, wherein the substrate comprises a polymer or cellulose paper.

3. (Previously Presented) The ink-jet recording medium of claim 1, wherein the substrate comprises poly(ethylene terephthalate).

4. (Canceled)

5. (Previously Presented) The ink jet recording medium of claim 1, wherein the fumed alumina particles comprise aggregates of primary particles, and the aggregates have a mean diameter of about 1 μm or less.

6. (Canceled)

7. (Previously Presented) The ink-jet recording medium of claim 1, wherein the alumina to binder ratio is about 2:1 by weight or more.

8.-28. (Canceled)

29. (Previously Presented) The ink-jet recording medium of claim 5, wherein the fumed alumina particles comprise aggregates of primary particles, and the aggregates have a mean diameter of about 80-300 nm.

30. (Previously Presented) The ink-jet recording medium of claim 29, wherein the fumed alumina particles comprise aggregates of primary particles, and the aggregates have a mean diameter of about 100-200 nm.

31.-32. (Canceled)

33. (Previously Presented) The ink-jet recording medium of claim 1, wherein the fumed alumina particles have a surface area of about 40-60 m^2/g.

34.-43. (Canceled)

44. (Previously Presented) The ink-jet recording medium of claim 7, wherein the alumina to binder ratio is about 7:1 by weight or more.

45. (Previously Presented) The ink-jet recording medium of claim 44, wherein the alumina to binder ratio is about 9:1 by weight or more.

46. (Previously Presented) The ink-jet recording medium of claim 1, wherein the glossy coating has a 75° specular gloss of about 65% or more.

47. (Previously Presented) The ink-jet recording medium of claim 1, wherein the glossy coating has a total mercury intrusion volume of about 0.3 ml/g or more.

48. (Previously Presented) The ink-jet recording medium of claim 47, wherein the glossy coating has a total mercury intrusion volume of about 0.8 ml/g or more.

49.-57. (Canceled)

58. (Previously Presented) The ink-jet recording medium of claim 5, wherein at least about 80% of the aggregates have a mean diameter of about 1 μm or less.

59. (Previously Presented) The ink-jet recording medium of claim 58, wherein at least about 90% of the aggregates have a mean diameter of about 1 μm or less.

60. (Previously Presented) The ink-jet recording medium of claim 1, wherein the fumed alumina particles comprise aggregates of primary particles, and the primary particles have a mean diameter of about 1-100 nm.

61. (Previously Presented) The ink-jet recording medium of claim 60, wherein the primary particles have a mean diameter of about 1-80 nm.

62. (Previously Presented) The ink-jet recording medium of claim 61, wherein the primary particles have a mean diameter of about 1-50 nm.

63. (Previously Presented) The ink-jet recording medium of claim 62, wherein the primary particles have a mean diameter of about 5-40 nm.

64. (Previously Presented) The ink-jet recording medium of claim 60, wherein at least about 80% of the primary particles have a mean diameter of about 1-100 nm.

65. (Previously Presented) The ink-jet recording medium of claim 61, wherein at least about 80% of the primary particles have a mean diameter of about 1-80 nm.

66. (Previously Presented) The ink-jet recording medium of claim 62, wherein at least about 80% of the primary particles have a mean diameter of about 1-50 nm.

67. (Previously Presented) The ink-jet recording medium of claim 63, wherein at least about 80% of the primary particles have a mean diameter of about 5-40 nm.